

REMARKS

Claims 1-13 are all the claims pending in the application. Claims 5-7 and 10-13 have been examined and rejected. Claims 1-4 and 8-9 have been withdrawn.

The Office Action mailed on August 16, 2004 contained in error in the rejection of claim 11. *See* Office Action at page 4. The Examiner was notified of this error by Applicant's representative. After receipt of this notification, the Examiner agreed to send a new Office Action clarifying the rejection of claim 11. A Supplemental Office Action was mailed on September 28, 2004. Applicant thanks the Examiner for providing the Supplement Office Action.

The prior art rejections included in the Supplemental Office Action are summarized as follows:

1. Claims 5-7, 10, 12 and 13 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Plester (WO 95/22413) in view of Denholm *et al.* (U.S. 5,911,832) or Liebert *et al.* (U.S. 6,020,592).

2. Claim 11 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Plester in view of Denholm as applied to claims 5-7, 10, 12 and 13 in further view of Hayashi *et al.* (U.S. 5,578,130), or, alternatively, over Plester in view of Liebert as applied to claims 5-7, 10, 12 and 13 in further view of Hayashi.

Applicant respectfully traverses.

35 U.S.C. § 103 REJECTIONS

A. Claims 5-7, 10, 12 and 13 over Plester in view of Denholm or Liebert

In rejecting claims 5-7, 10, 12, and 13 over Plester in view of Denholm or Liebert, the Examiner relies on the Plester reference to teach the same elements as stated in the previous Office Action. Office Action at pages 2-3. The Examiner acknowledges, however, that Plester fails to teach applying high voltage positive pulses to the electrode and an apparatus that implants ions into an interior side surface of the container. Office Action at page 3. To overcome this deficiency in Plester, the Examiner separately relies on Denholm and Liebert.

With respect to the teachings of Denholm and Liebert, the rejection states:

Referring to column 4, line 3-column 5, line 40 of Denholm et al. or column 4, lines 50-57 and column 5, lines 12-33 of Liebert et al., Denholm et al. or Liebert et al. discloses an apparatus that applies high voltage positive pulses to an electrode inside of the chamber in order to accelerate (implant) ions into the substrate with the desired depth and dose of impurity material (col. 4, lines 33-38 of Denholm et al., col. 5, lines 22-30 of Liebert et al.). Additionally, since it is well established in the art that a substrate is merely the material that is processed or worked upon by the apparatus, the substrate in the instant application is simply the interior side surface of the container. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to apply high voltage positive pulses to the electrode inside of the container of Plester as taught by Denholm et al. or Liebert et al. in order to accelerate ions into the interior side surface of the container with the desired depth and dose of impurity material.

Office Action at pages 3-4. Applicant respectfully disagrees.

Applicant's invention involves the *modification* of the interior surface of the container, as opposed to *coating* the container. For example, Applicant's specification states:

In this embodiment, ions are implanted thus into the whole area of the interior side surface of the PET container 2. Accordingly, the material itself of the interior side surface of the PET container 2 originally containing carbon are modified into DLC (diamond-like carbon) throughout (see Fig. 4). That is, in this embodiment, the original surface of the PET container 2 is not coated with DLC but the material itself of the surface of the PET container 2 is modified into DLC

so that a DLC layer 22 is formed all over the interior side surface as shown on the right of Fig. 4.

Specification at page 13. *See also* Applicant's specification at page 26, line 23 to page 27, line 2.

Applicant's claim 5 as amended recites the feature of *modifying* the interior side surface of the container through ion implantation. Plester, on the other hand, certainly does not teach or suggest this feature.

The grounds of rejection do not assert that the system for forming an inert/impermeable surface disclosed in Plester actually *modifies* a portion of the inside of the container being treated. Indeed, Plester emphasizes *coating* the inside surface of the container. *See, e.g.*, Plester at page 5, lines 10-27; page 7, lines 16-24; page 12, lines 29-32.

Clearly, therefore, Plester does not teach or even hint at a device that implants ions into the interior side surface of the container so as to modify the interior side surface, as recited in the claim 5. To the contrary, the objective of Plester is to deposit a thin polymer *coating* on the surface (*see, e.g.*, the abstract). Plester explains that the internal surface of the container is changed by surface reaction or surface activation (*see* page 13, lines 4 to 17). However, Plester makes clear that "free radicals formed thereby are induced at the inner surface of the container before the reactant gases are introduced. After cleaning and surface activation ... provides in situ plasma assisted polymerization." Plester at page 10, line 23 to page 11, line 4. This means, surface activation is induced before the coating. However, there is no description that the inner surface of the container is modified into a material that is not permeable through surface activation. Rather, referring to page 11, lines 5-14 of Plester, the polymer *coating* makes the material non-permeable. Moreover, in making the material non-permeable, there is no suggestion in Plester of implanting ions as recited in claim 5.

Applicant made substantially the same argument in response to the previous Office Action. In response, the Examiner merely states that the Applicant's arguments have been considered but are moot in view of the new grounds of rejection. However, the newly cited references do not cure the deficiencies of Plester. Therefore, Applicant submits that claims 5-7, 10 and 12-13 are allowable over the cited art for at least this reason.

To overcome the admitted deficiencies in Plester, the Examiner separately relies on the teachings of Denholm and Liebert. Plester relates to a method of coating the inner surface of a container by use of a metal gas tube 3. *See* Fig. 1. Denholm relates to a method of treating a wafer surface by causing ions to impact a surface of the wafer. Abstract, col. 1, lines 18-37; Fig. 1. In Denholm, the positively pulsed manifold 32 is above the wafer 14, not inside a container. Liebert teaches a similar apparatus. *See* Fig. 1.

The Examiner has, however, provided no motivation as to why one of ordinary skill in the art would combine Plester with Denholm or Liebert. The prior art must suggest the desirability of making the claimed invention. MPEP 2143.01. Such a suggestion is absent from the cited art. Instead, Denholm actually teaches away from the Examiner's proposed modification. One embodiment of Denholm includes an ultraviolet light source 102 that allows ultraviolet light to pass between manifold 32 and platen 30 by entering the chamber through a window 104. *See* Fig. 1A; col. 5, lines 52-60. To modify the Denholm apparatus so that manifold 32 was located inside a container while platen 30 was outside the container would impermissibly destroy this key embodiment.

Further, neither Denholm nor Liebert can implant ions to the interior side surface of the container even if a container is disposed on a plate. In the ordinary plasma density as used in

Denholm and Liebert, since the normal diameter of the mouth of the PET container is not larger than 2 cm, the plasma outside of the PET container cannot connect to the interior side thereof. That is, even if the positive high voltage is applied to the positive electrode, the positive high voltage is not applied to the plasma in the interior side of the PET container. Thus, neither Denholm nor Liebert cannot implant ions to the interior side surface of the container.

Further, in Plester, the electrode inserted into the container merely generates plasma by discharging supplied RF power. That is, Plester does not teach or suggest applying high voltage pulses to the electrode so as to make the plasma in the interior side of the container into positive high voltage. Thus, Plester cannot implant ions to the interior side surface of the container.

Thus, Applicant submits that Plester in view of Denholm or Liebert does not teach or suggest inserting the electrode to which the positive high voltage pulses are applied so as to change the plasma in the interior side of the container. That is, Plester in view of Denholm or Liebert cannot "implant ions to the interior side surface of the container" as recited in claim 5 of the application.

In view of the foregoing distinctions, the Examiner is kindly requested to withdraw the rejection of claim 5 and allow this claim and its dependent claims to issue.

B. Claim 11 over Plester in view of Denholm in further view of Hayashi or, alternatively, over Plester in view of Liebert in further view of Hayashi.


As claim 11 depends on claim 5, and as the Hayashi reference fails to cure the deficiencies of Plester, Denholm and Liebert discussed above with respect to claim 5, Applicant submits that claim 11 is patentable over the cited references at least based on this dependency.

CONCLUSION

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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